



PATENT APPLICATION

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re the Application of

Group 2882

Martin Feldman *et al.*

Serial No. 09/726,640

Examiner Kao, Chih Cheng G.

Filed: November 30, 2000

For: "Optical Crossbar Switch" (Atty. File No. 0026 Feldman)

REQUEST FOR CONTINUED EXAMINATION UNDER 37 C.F.R. § 1.114

Mail Stop RCE
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Dear Sir:

This Request for Continued Examination is submitted in response to the Final Action dated October 3, 2003.

The enclosed check for \$595 includes both: (1) the \$385 fee for a request for continued examination (37 C.F.R. § 1.17(e)); and (2) the \$210 fee for a two-month extension of time for a small entity, to extend the time for response from January 3, 2004 to March 3, 2004. (37 C.F.R. § 1.136(a)(3)). If this amount is incorrect, please refer to the

CERTIFICATE

I hereby certify that this Request for Continued Examination and the enclosed check for \$595 are being deposited with the United States Postal Service as first class mail in an envelope addressed to: Mail Stop RCE, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450 on February 26, 2004.

03/03/2004 HVUONG1 00000158 09726640

01 FC:2801 385.00 OP

03/03/2004 HVUONG1 00000158 09726640

02 FC:2252 210.00 OP

John H. Runnels
Registration No. 33,451
February 26, 2004

Deposit Account Authorization previously filed for this application. If any additional extension of time is required, please consider this paper a petition for the total extension of time required.

Reexamination and reconsideration of the application are respectfully requested.

No additional amendments are presented.

Claims 1-26 remain in the application.

The § 103(a) Rejections

The sole remaining ground of rejection is that all Claims were said to be obvious under 35 U.S.C. § 103 over a proposed combination of Nishi, Christensen, and Healy; and in the case of some of the dependent claims, in combination with further secondary references as well.

Claim 1 is the sole independent Claim. If independent Claim 1 is novel and nonobvious, it necessarily follows that dependent Claims 2-26 are novel and nonobvious as well. In the interest of brevity, the following discussion therefore focuses on independent Claim 1 only. Applicants reserve the right to present arguments concerning the dependent Claims at a later date, should there appear to be a need to do so.

For the record, it is not conceded that either Nishi or Christensen is available as prior art against any of the claimed inventions. For the time being Applicants will show instead why the claimed inventions would not have been obvious over the proposed combination of references, even if one assumed for the sake of argument that all cited references were available as potential prior art.

Nothing in Nishi, Christensen, or Healey teaches or suggests the following limitation of independent Claim 1:

the net angular deflection of the light caused by all said input deflectors, which is a function of the directions of polarization of the light as it passes through each of said input deflectors, causes the light to be directed to the selected receiver.

Using a net angular deflection to direct light to a selected receiver is neither taught nor suggested by any of the cited references.

The October 3, 2003 Office Action expressly agreed that Nishi does not teach the use of a net angular deflection as recited. It also appears that the Office has implicitly agreed that Christensen neither teaches nor suggests this feature. Instead, the Office has suggested that the newly-cited Healey reference appears to teach the use of a net angular deflection. For the reasons given below, Applicants respectfully submit that a careful review of Healey will show that Healey neither teaches nor suggests the use of a net angular deflection as recited in Claim 1.

Nishi. The June 26, 2003 Amendment at page 10 explained in detail why Nishi neither teaches nor suggests the recited limitation. The Office evidently agreed, stating at page 3 of the October 3, 2003 Office Action: "However, Nishi et al. does not disclose light sources and receivers nor a net angular deflection of light caused by deflectors to be directed to the receiver."

Christensen. As explained in the June 26, 2003 Amendment at page 11, the "beam steering devices" (e.g., prisms or diffraction gratings) of Christensen deflect light by a fixed, unchanging angle, apparently in order to reduce aberrations in the lenses. See, e.g., Christensen's Fig. 5 and Col. 4, line 61 through Col. 5, line 6. Christensen's "beam steering devices" are not switches.

It is Applicants' understanding that the Office does not disagree with Applicant's interpretation of Christensen. In the context of Claim 1, the October 3, 2003 Office Action at page 3 instead cited Christensen for the proposition that "Christensen et al. teaches light sources and receivers."

Healey. The October 3, 2003 Office Action at page 3 says, "Healey et al. teaches a net angular deflection of light caused by deflectors to be directed to the receiver (Fig. 3)."

Applicants agree with the Office that, on initial impression, Healey's Figure 3 indeed appears to depict a net angular deflection of light. However, a closer examination of Healey's disclosure reveals that, in fact, Healey neither teaches nor suggests the use of a net angular deflection of light.

At Col. 3, lines 9-22, referring now to Figure 2, Healey describes the deflector stages S1, S2, and S3 as "digital light deflectors." Healey states:

If the optical signal entering a calcite crystal is linearly polarized in the horizontal direction it will pass straight through the crystal as the ordinary ray, if polarized in the vertical direction it will be deflected as if [sic] propagates as the extraordinary ray to exit the crystal **D *displaced relative to an ordinary ray but parallel to it.*** The displacement between the ordinary and extraordinary rays is directly proportional to the thickness of the deflector crystal. Thus by employing stages with thicknesses in the ratio 1:2:4, 8 possible increments of displacement are possible.

(emphasis added)

Healey's Figure 2 illustrates that the rays remain parallel after displacement, as described in the specification. Each of the calcite crystals D1, D2, and D3 may either allow the light to pass through undeflected, or deflect the light so that the light is ***"displaced relative to an ordinary ray but parallel to it."***

Healey teaches that the two possible outputs from each deflector stage are parallel to one other, i.e., there is no net angular deflection. By contrast, the claimed invention ***requires*** that the two possible outputs from each stage not be parallel to one other, but instead must be separated by a net angular deflection from one another. The use of a net angular deflection allows certain advantages, such as the ability to employ a more compact arrangement employing fewer of the relatively expensive components. In addition, the claimed invention may be employed as an $n \times m$ switch, in which each of n inputs may ***simultaneously*** and ***independently*** be switched to any of m different outputs, without large intensity losses. By contrast, Healey's device is inherently an $n \times 1$ switch, in which each of n inputs may only be switched to a single output. See Col. 2, lines 21-23.

Healey's displacement-based $n \times 1$ switch could not be extended to an $n \times m$ switch without incurring high intensity losses.

Note that in Healey's Figure 2, the light rays entering the device are parallel to one another, i.e., the light beam is collimated.

When one considers Figure 3 in the context of Healey's specification, it becomes clear that the point that Healey *et al.* intended to illustrate in that figure was rather limited. The purpose of Figure 3 was to illustrate that Healey's device could be used not only with collimated light beams, but also with divergent light beams as well – a feature that was said to be particularly useful in fiber optic applications. The light from a single divergent input light beam could be focused to a particular output location after passing through the device; and the light from different inputs could be focused to different outputs, displaced from one another. Among other things, the following description makes clear that Figure 3 was intended to depict the same type of device as shown in Figure 2, and that Figure 3 was intended to illustrate how such a device works when the input light beam is divergent rather than collimated:

Referring now to FIG. 3 there is illustrated how the three deflection stages S of FIG. 2 operate with divergent beams of which only that from I_6 is shown in clarity. Only optical signals from input I_6 would be directed by lenses 14 and 16 to be focussed on the output O, the other inputs being focussed to a position ***displaced*** from the output O, when all three rotators 12 are activated. The other inputs I can be selectively switched to the output by activating other combinations of rotators R ***to provide different total deflections as described for non-divergent beams with reference to FIG. 2.*** The use of divergent beams as shown in FIG. 3 is particularly attractive for fiber optic circuits.

(Col. 3, line 66 to Col. 4, line 10; emphasis added)

In other words, Healey described how the device would work similarly both with collimated beams and with divergent beams. In both cases, the outputs would be ***displaced*** by an amount that depended on the applied polarizations. In both cases, the output would be sent to (or could be focused to) a single location.

Note that Healey's discussion of Figure 3 refers to displacement of the output, not to a net angular deflection. Nothing in Healey's specification even hints at using a net angular deflection rather than a displacement. Nor does anything in Healey teach or suggest how one might achieve a net angular deflection in lieu of a displacement, even were one inclined to do so for some reason.

So why, one might ask, does Healey's Figure 3 appear to depict an angular displacement? The most likely explanation appears to be that some of the rays shown in Figure 3 were drawn incorrectly as the result of a simple drafting oversight, an oversight that was overlooked when the Healey patent application was filed. Healey's Figure 3 was described as being "schematic," and should therefore be understood as not necessarily being to scale. (Col. 2, lines 10-13). The purpose of Figure 3 was to illustrate that the Healey's device might be used with a divergent input, and that it was not limited to use with a collimated input. Figure 3's rectangular calcite blocks D1, D2, and D3 will not, in fact, produce a net angular deflection, but instead should produce parallel displacements whose magnitude depends on the various applied polarizations, as Healey described in Col. 3, lines 9-22.

The fact that Fig. 3 includes uncorrected drafting oversights becomes apparent if one traces the paths of the rays through lenses 14 and 16. Note that the refraction (or apparent absence of refraction) depicted at the lens surfaces does not always appear to be consistent with Snell's Law.

Healey's Figure 3 clearly contains drafting oversights. These oversights were apparently unnoticed when Healey's patent application was filed, because Figure 3 was nevertheless acceptable for its intended function – namely, to show that the device could be used with a divergent input beam.

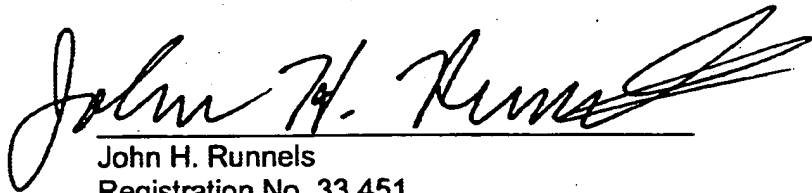
A person of ordinary skill in the art would recognize both that Healey's Figure 3 contains drafting oversights, and that the oversights were of no great consequence for the intended purpose of that Figure. However, a person of ordinary skill in the art would not interpret Healey's Figure 3 as teaching or suggesting the use of a net angular deflection as recited in Claim 1 of the present application, much less how to achieve such an end.

§103(a) Summary. Neither Nishi, nor Christensen, nor Healey, nor a hypothetical combination of the three cited references would suggest the claimed inventions. It is respectfully submitted that all prior art grounds of rejection should be withdrawn.

CONCLUSION

It is respectfully submitted that all pending Claims are in condition for allowance. If the Office disagrees with any of these remarks, or if other issues arise that may present an obstacle to allowance, the undersigned would welcome a telephone call to discuss such matters before further action is taken. Otherwise, allowance of Claims 1-26 at an early date is respectfully requested.

Respectfully submitted,

A handwritten signature in dark ink, appearing to read "John H. Runnels", is written over a horizontal line.

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